

# (12) UK Patent Application (19) GB (11) 2 310 977 (13) A

(43) Date of A Publication 10.09.1997

(21) Application No 9704780.7

(22) Date of Filing 07.03.1997

(30) Priority Data

(31) 9605889

(32) 07.03.1996

(33) GB

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G08B 13/24

(52) UK CL (Edition O )

H4L LADXX

(56) Documents Cited

GB 2246492 A

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US 5294290 A

US 4783646 A

(58) Field of Search

UK CL (Edition O ) H4L LADMX LADTX LADX LADXX

INT CL<sup>6</sup> G01V 15/00 , G08B 13/24

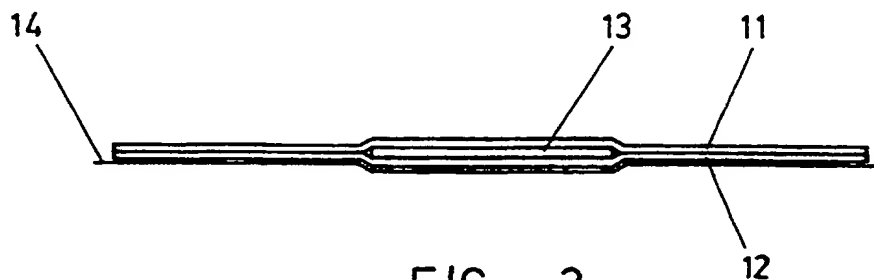
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(54) Flexible label containing detectable sensor for security tagging

(57) A label for security tagging of goods comprises a flexible sheet 11 and sensor 13 detectable by radio frequency, electromagnetic or acoustomagnetic means. The sensor may be a circuit printed on a wafer thin flexible membrane and attached to the back of the sheet, sandwiched between two sheets 11, 12 or fitted into a window opening in the sheet such that in all cases the label appears to be a normal flat label. The label may have an adhesive layer protected by a backing layer 14 for attachment to articles such as bottles or may be attached to garments by stitching or staples and may be hidden in the pocket or lining of a garment. The sheet may be made of paper or card and have information printed on it. An audible alarm may sound if the label passes through a detection device. It may be used with intelligent devices of the 'radio frequency identification' (RFID) type.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

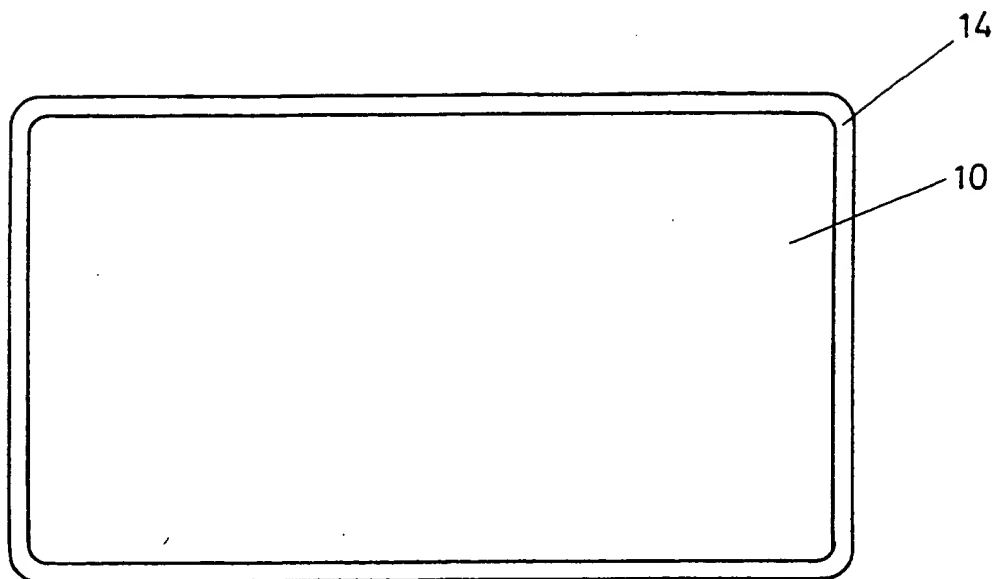


FIG. 1

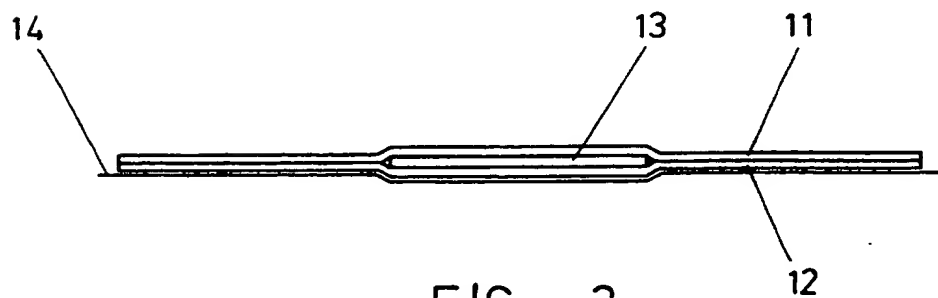


FIG. 2

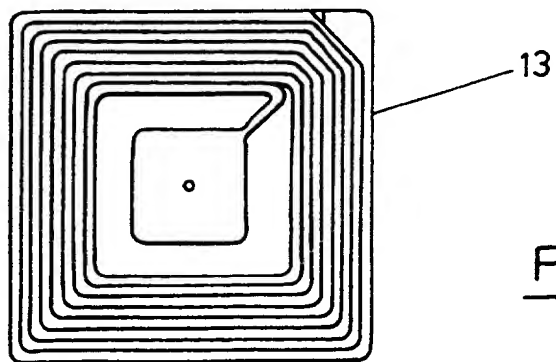


FIG. 3

**LABELS**

The invention relates to labels.

- 5           The invention comprises a label for use in security tagging, the label comprising a flexible sheet associated with a detectable sensor.

The sensor may be surrounded by the sheet.

- 10           The sensor may be fitted into a window opening in the sheet, so that the label has a uniform thickness.

The sheet may comprise a pair of flexible layers with a flexible sensor sandwiched therebetween.

15

The flexible sensor may comprise an electric circuit.

The electric circuit may be a printed circuit.

- 20           The circuit may be printed or formed on a wafer thin flexible membrane.

The sheet may have an adhesive backing, to facilitate the attachment of the sheet to an article.

25

Prior to use, the adhesive layer may be protected by a backing layer coated with a release agent.

The invention makes it possible to produce a label which has the appearance of an information tag, for example for attachment to a garment, or an information label, for example for attachment to a bottle or other article. The label can thus be used as a covert anti-pilfering device. Modern high speed label manufacturing machinery enables the anti-pilfering devices to be produced without the high cost of the manual incorporation of tags on to labels.

The invention includes a method of manufacturing labels, each comprising a flexible sheet associated with a detectable sensor, the method comprising bringing together in a label manufacturing machine a support web, and a plurality of flexible sheets each associated with a detectable sensor, to provide a succession of security tags supported on the support web.

By way of example, a specific embodiment of the invention will now be described, with reference to the accompanying drawings, in which :-

Figure 1 is a plan view of an embodiment of label according to the invention;

20

Figure 2 is a cross-sectional view through the label of Figure 1, not to scale; and

Figure 3 is a plan view of an electrically detectable sensor forming part of the embodiment of label according to the invention.

25

The label forming the subject of this embodiment is to all outward appearances a single layer, flexible information label as shown at 10 in Figure 1. The label may for example be made from paper or card.

5 In practice, as can be seen from Figure 2, the label in reality comprises an upper layer 11 and a lower layer 12 securely laminated together.

Trapped between the laminations is a flat, flexible electric circuit 13 which is shown in plan view in Figure 3.

10

The circuit can be made wafer thin, with a thickness of from .05 to .2 of a millimetre. The thickness is exaggerated in Figure 2 for the purposes of illustration, but in practice, the circuit is so thin that there is no significant visual disturbance in the surface of the upper layer 11, so that the label  
15 appears to be a normal information label.

The underside of the label is coated with an adhesive which, prior to use, is protected by a tear-off backing strip 14 coated with a release agent.

20 In use the label may be attached, for example using the adhesive backing, to an article to be protected from pilfering. The upper face of the label may be printed with information. This is not only useful since labels often have to convey information anyway, but it also increases the covert nature of the label as a security tag.

25

The label is sufficiently flexible that it could, for example, be secured around a bottle containing spirits. Alternatively, the label could be attached

to a garment, for example by stitching, staples, or a conventional tag attachment.

Another possibility is for the label to be placed in a discreet position  
5 in a garment, for example in a pocket or hidden within a lining.

The electric circuit shown in Figure 3 is such that if the label passes  
through a detection device, for example a device arranged to transmit radio  
frequency waves, then an audible alarm sounds.

10

In an alternative embodiment, the circuit 13 may be adhered to the  
underside of a single layer sheet.

In a further alternative embodiment, a window opening may be cut out  
15 of one of the layers, the circuit fitting into the window opening so that the  
label has the same overall thickness.

In yet another embodiment, the detectable sensor is such that detection  
can be carried out by electromagnetic, radio frequency or acoustomagnetic  
20 means.

The invention could also be used with the inclusion of intelligent  
devices such as those currently available for other purposes under the generic  
name of "radio frequency identification" (RFID).

25

The reader's attention is directed to all papers and documents which are  
filed concurrently with or previous to this specification in connection with this  
application and which are open to public inspection with this specification, and

the contents of all such papers and documents are incorporated herein by reference.

5 All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

10 Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar  
15 features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any  
20 accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

**CLAIMS**

1. A label for use in security tagging, the label comprising a flexible sheet associated with a detectable sensor.  
5
2. A label as claimed in Claim 1, in which the sensor is surrounded by the sheet.
3. A label as claimed in Claim 2, in which the sensor is fitted into a  
10 window opening in the sheet, so that the label has a uniform thickness.
4. A label as claimed in Claim 2, in which the sheet comprises a pair of flexible layers with a flexible sensor sandwiched therebetween.
- 15 5. A label as claimed in Claim 1, in which the sensor is adhered to the underside of the sheet.
6. A label as claimed in any one of Claims 1 to 5, in which the flexible sensor comprises an electric circuit.  
20
7. A label as claimed in Claim 6, in which the electric circuit comprises a printed circuit.
8. A label as claimed in Claim 6 or Claim 7, in which the circuit is  
25 printed or formed on a wafer thin flexible membrane.
9. A label as claimed in Claim 6 or Claim 7, in which detection is by electromagnetic, radio frequency or acoustomagnetic means.



10. A label as claimed in any one of the preceding claims in which the sheet has an adhesive backing, to facilitate the attachment of the sheet to an article.

5 11. A label as claimed in Claim 10, in which the adhesive layer is protected by a backing layer coated with a release agent.

12. A label constructed and arranged substantially as herein described, with reference to the accompanying drawings.

10

13. A method of manufacturing labels, each comprising a flexible sheet associated with a detectable sensor, the method comprising bringing together in a label manufacturing machine a support web, and a plurality of flexible sheets each associated with a detectable sensor, to provide a succession of  
15 security tags supported on the support web.

14. A method of manufacturing labels, each comprising a flexible sheet associated with a detectable sensor, substantially as herein described.



Application No: GB 9704780.7  
Claims searched: All

Examiner: Gareth Griffiths  
Date of search: 28 April 1997

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H4L (LADMX, LADTX, LADXX, LADX)

Int Cl (Ed.6): G01V 15/00, G08B 13/24

Other:

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB2246492 A (CHIKARA SHIMAMURA) pages 7,8 & 13	1, 5-10
X	GB2235609 A (MONARCH MARKETING) see figs 1-3	1, 2, 4-11, 13
X	EP0670563 A1 (FLEXCON) whole document	1, 2, 4-10
X	EP0280361 A1 (NEDAP) whole document	1, 2, 4-11
X	US5294290 (REEB) col.11 line 36 - col.14 line 13	1, 2, 4-11, 13
X	US4783646 (MATSUZAKI) whole document	1-9, 13

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.  
& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.